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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/923,647	08/07/2001	Roman J. Hamerski	12263.15	1145

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40 CORPORATE WOODS
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EXAMINER
SOWARD, IDA M

ART UNIT	PAPER NUMBER
2822	

DATE MAILED: 09/13/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Applicati n No.	Applicant(s)	
	09/923,647	HAMERSKI ET AL.	
	Examiner	Art Unit	
	Ida M Soward	2822	

-- Th MAILING DATE f this communication appears on the cover sheet with the correspondence address --

Peri d for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *05 August 2002* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disp sition of Claims

4)☒ Claim(s) *1-15 and 21* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-15 and 21* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Pri rity under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of Ref rences Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 5 .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

This Office Action is in response to the election filed August 5, 2002.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-2 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nishida et al. (3,789,503) in view of Liaw et al. (5,141,887).

Nishida et al. teach an electrical semiconductor device comprising: a substrate **11** of relatively high resistivity material of one conductivity type having opposing first and second surfaces and a layer **14** of relatively low resistivity material of the one conductivity type and having one surface substantially contiguous to the first surface of the substrate; and the layer diffused in the first surface of the substrate (Figure 1, cols. 1-2, lines 65-67 and 1-13, respectively). However, Nishida et al. fail to teach an epitaxial region of a conductivity type opposite to the one conductivity type and having one surface substantially contiguous to the second surface of the substrate. Liaw et al. teach an epitaxial region of a conductivity type opposite to the one conductivity type and having one surface substantially contiguous to the second surface of the substrate (col. 8, lines 1-4). Also, it is within the level of ordinary skill to etch the surfaces of a

substrate to remove native oxides and contaminants accumulated during handling. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the substrate and low resistivity layer of Nishida et al. with the epitaxial region of Liaw et al. to lower manufacturing costs.

Claims 4-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nishida et al. (3,789,503) and Liaw et al. (5,141,887) as applied to claims 1-2 above, and further in view of Davis et al. (5,668,397).

Nishida et al. and Liaw et al. teach all mentioned in the rejection above. However, Nishida et al. and Liaw et al. fail to teach a germanium stress-relieving dopant. Davis et al. teach a germanium stress-relieving dopant (col. 4, lines 25-39, claims 10 and 39). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the substrate and low resistivity layer of Nishida et al. and the epitaxial region of Liaw et al. with the germanium stress-relieving dopant of Davis et al. to improve performance characteristics.

Claims 3, 6-9, 12, 15 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nishida et al. (3,789,503) and Liaw et al. (5,141,887) as applied to claims 1-2 above, and further in view of Yamada (6,160,288).

Nishida et al. and Liaw et al. teach all mentioned in the rejection above. However, Nishida et al. and Liaw et al. fail to explicitly teach an epitaxial layer further having a dopant material permeated throughout the layer. Yamada teaches an epitaxial

layer **2** further having a dopant material permeated throughout the layer. Yamada further teaches a first layer **2** of relatively high resistivity material of one conductivity type having opposing first and second surfaces; a second layer **3** of relatively low resistivity material of a conductivity type opposite to the one conductivity type and having one surface substantially contiguous to the first surface of the substrate; a region **1** of relatively low resistivity material of the one conductivity type and having one surface substantially contiguous to the second surface of the substrate; and a substantially centrally located well **4** and a well formed by second layer **3** in the first layer such that the distance between the region and the second layer is reduced at the location of the well formed by second layer **3**; a layer **9** epitaxially grown onto the first surface of the substrate (Figure 1, col. 7, lines 42-58). In regard to claims 9 and 15, note that a "product by process" claim is directed to the product per se, no matter how actually made, In re Hirao, 190 USPQ 15 at 17 (footnote 3). See also In re Brown, 173 USPQ 685; In re Luck, 177 USPQ 523; In re Wertheim, 191 USPQ 90 (209 USPQ 554 does not deal with this issue); In re Fitzgerald, 205 USPQ 594, 596 (CCPA); In re Marosi et al., 218 UPSQ 289 (CAFC); and most recently, In re Thorpe et al., 227 UPSQ 964 (CAFC, 1985) all of which make it clear that it is the final product per se which must be determined in a "product by process" claim, and not the patentability of the process, and that, as here, an old or obvious product produced by a new method is not patentable as a product, whether clamed in "product by process" claims or not. Note that Applicant has burden of proof in such cases as the above case law makes clear. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention

was made to modify the substrate and low resistivity layer of Nishida et al. and the epitaxial region of Liaw et al. with the epitaxial layer of Yamada to provide a semiconductor device capable of handling relatively large currents and voltages.

Claims 10-11 and 13-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nishida et al. (3,789,503), Liaw et al. (5,141,887) and Yamada (6,160,288) as applied to claims 1-2 and 4-5 above, and further in view of Davis et al. (5,668,397).

Nishida et al., Liaw et al. and Yamada teach all mentioned in the rejection above. However, Nishida et al., Liaw et al. and Yamada fail to teach a germanium stress-relieving dopant. Davis et al. teach a germanium stress-relieving dopant (col. 4, lines 25-39, claims 10 and 39). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the substrate and low resistivity layer of Nishida et al., the epitaxial region of Liaw et al. and the epitaxial layer of Yamada with the germanium stress-relieving dopant of Davis et al. to provide devices with high frequency responses.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

The following patents are cited to further show the state of the art with respects to high voltage diodes:

Das (5,294,814)

Ranjan (5,801,431)

Ranjan (5,861,657)

Zambrano et al. (5,895,249).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ida M Soward whose telephone number is 703-305-3308. The examiner can normally be reached on Monday - Thursday, 6:30 am to 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead, Jr. can be reached on 703-308-4940. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-7722 for regular communications and 703-308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

ims
September 7, 2002

Carl Whitehead Jr.

CARL WHITEHEAD, JR.
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800